

REMARKS:

Claims 49-67 are in the case and presented for consideration.

Claims 30-48 have been canceled and a new Abstract has been presented to address the Examiner's objection to the original Abstract.

Claim Objections

On page 2 of the above referenced Office Action, claims 39-40 were objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Also on page 2 of the Action, claims 35-37,39-44,46-48 were objected to certain informalities.

New claims 49-67 were drafted in accordance with Examiner's suggestions and are believed to be in proper form.

Rejection under 35 U.S.C. § 112, second paragraph:

On page 7 of the Action, Claims 30-48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicant respectfully traverses the Examiner's objection to the term "neutral plan" on page 8 of the Action. The term "neutral plane" (or "neutral axis") is well-known in the mechanical engineering field and for a long time has been considered common knowledge among those of ordinary skill in the art of mechanical engineering. The neutral plane of a film (a sheet or a beam) is that plane which does not undergo compression or tension when the film is subjected to flexural stress, i.e. the plane is not on the tension side or the compression side of the film.

Aside from the aforementioned, new claims 49-67 were drafted with Examiner's diligent observations in mind and it is believed that they particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Rejection under 35 U.S.C. § 102(b):

Claims 30-32 were rejected under 35 U.S.C. 102(b) as being anticipated by European Patent Application EP 0800915 to Shepard et al. (hereinafter "Shepard").

Applicant respectfully disagrees with Examiner's holding that Shepard anticipates the present invention. In order for a claim to be anticipated, all the elements of the claim must be disclosed within a single prior art reference. Additionally, dependent claims are understood to contain all the elements of the claims from which they depend.

Shepard does not disclose or suggest the relative positions of the layers with higher and lower Young's modulus, either with respect to each other or in relation to the neutral plane of the film. Additionally, Shepard does not mention Young's modulus at all and with respect to the property of stiffness, the only thing Shepard discloses is that "[n]ylon polyamides, which are synthetic polyamides, have favorable physical properties of high strength, stiffness and abrasion resistance." Col.2 ln.1-3. Furthermore, nowhere in the reference is the neutral plane mentioned.

In the present invention, the relative and varying stiffness of the respective layers, which is represented by Young's modulus, as well as their position in relation to the neutral plane, are critical elements in achieving the objects of the present invention. Accordingly, new independent claim 49 has several elements directed to these features.

Therefore, because Shepard does not disclose several elements which are claimed in new independent claim 49 and because all other claims depend from claim 49, Shepard

does not anticipate the present invention.

Rejections under 35 U.S.C. § 103(a):

Claim 44 was rejected under 35 U.S.C. 103(a) as being unpatentable over Shepard.

As discussed above, Shepard fails to disclose several elements claimed in new independent claim 49, which is the only independent claim, from which all other claims depend.

Also on page 4 of the Action, claims 30-41, and 44-48 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,110,600 to Ramesh (hereinafter "Ramesh").

Applicant respectfully disagrees with Examiner's holding. Ramesh discloses features which conflict with critical features claimed in the present application.

Firstly, Ramesh discloses both outer layers being made from polyamide, i.e. a polymer having higher Young's modulus. In contrast, the film claimed in the present application claims only one outer layer made from a polymer having high Young's modulus. In fact, the other two layers made from polymers having higher Young's modulus are inner layers. In the present application, the other outer layer is made from a polymer having a lower Young's modulus.

Additionally, referring to the embodiment represented in Ramesh's Fig. 1, the gas barrier layer i.e., layer 32, is made from polymers including ethylene/vinyl alcohol copolymers, polyamides, etc, Col. 5, In. 11-15, which have high Young's modulus. Further, layer 32 is adjacent to layer 26 which is also made of polymers having a high Young's modulus. Thus, Ramesh discloses two adjacent inner layers made from polymers with higher Young's modulus. In contrast, present independent claim 49 expressly claims that

those layers which are made from polymers with higher Young's modulus are separated from each other by at least one layer made from a polymer with lower Young's modulus.

Furthermore, although the problem of how to reduce curl is addressed by Ramesh, the solution which is presented is completely different from that which is claimed in the present application.

The film disclosed in Ramesh exhibits a symmetric structure. Col. 7 ln. 46-50. The advantage of a symmetric structure is that it does not, or only scarcely, exhibit the drawback of curl. Therefore, Ramesh does not disclose or suggest a film with an asymmetrical structure. In fact the efficacy of the symmetrical structure in Ramesh, would suggest to one of ordinary skill in the art that to use an asymmetrical structure would be ineffective.

However, the film claimed in the present invention is intentionally claimed so that its structure is asymmetrical.

Therefore, Ramesh does not render the present invention obvious both because it lacks critical elements claimed in the present invention and because it teaches against using the combination of elements in the present invention to solve the problems of the prior art.

On page 6 of the Action, claim 42 was rejected under 35 U.S.C. 103(a) as being unpatentable over Ramesh in view of U.S. Patent 4,429,079 to Shibata et al. (hereinafter "Shibata"). Additionally, claim 43 was rejected under 35 U.S.C. 103(a) as being unpatentable over Ramesh in view of U.S. Patent 6,245,437 to Shiiki et al. (hereinafter "Shiiki").

Applicant respectfully disagrees with Examiner's holding. As mentioned above, in order for a claim to be rejected for obviousness under 35 U.S.C. 103(a), all the elements

of said claim must be found in the prior art references or references used as the basis of the rejection.

As discussed above, Ramesh lacks critical elements of the present invention claimed in new independent claim 49. Additionally, said critical elements missing from Ramesh are not disclosed in either Shibata or Shiiki. Therefore the combination of Ramesh, Shibata and Shiiki would not render the invention as now claimed obviousness under 35 U.S.C. 103(a).

Further Considerations and Comments:

The main aim of the present invention is to provide films that do not exhibit the drawback of the prior art as discussed in the published version of the subject application, US2006/0159941 at paragraph [0034], notwithstanding their asymmetrical structure. This is because the claimed films are also well-balanced. Consequently, the films according to the present invention are flat after they are subjected to a biaxial-orientation process. According to the present invention, the said drawback is overcome by combining a specific selection of the following mandatory features in a multilayer film:

- 1) type of polymer constituting each layer, the said polymer having specific mechanical properties, in particular the Young's modulus;
- 2) positioning of the layers having a higher Young's modulus in the film in relation to the neutral plane, and
- 3) the thickness of the said layers.

The position of the each layer with a higher Young's modulus is connected up with the neutral plane by its own thickness. Hence, the suitable thickness of each single layer,

especially the thickness of those layers having high Young's modulus is important to prepare the claimed flat films.

The combination of these features results in a flat film after the biaxial-orientation process. This is because the sum of the moments exerted by the layers in relation to the neutral plane is nil, or substantially nil, in the films of the present invention.

The description of the multilayer films given by Shepard is limited to the type of polymers to be used in each layer. The films of the present invention are flat after the biaxial-orientation process. Shepard does not explicitly or implicitly describe how to achieve this effect in the films. Shepard describes (a) the type of polymer constituting the layers and the sequence described in column 11. However, it is not enough to anticipate the flat films claimed in the case in reference. As a matter of fact, Shepard should also have described (b) the position of the layers with a higher Young's modulus in relation to the neutral plan of the film. Besides that, Shepard should have described (c) the thickness of the each single layer of nylon and adhesive. Shepard also does not mention or suggest the neutral plan of the whole film.

With respect to the claimed thicknesses of the layers, Shepard provides no teaching so that the person of ordinary skill in the art reading Shepard would only learn that the relative thickness of each single layer of nylon and adhesive is an irrelevant feature.

As to the thickness, there is one further point to consider, i.e. the difference between the overall thickness of nylon layers in the prior art films and that in the films of the present invention. The former ranges from 5 to 20% in respect of the overall thickness of the whole film. Unlike the prior art film, the overall thickness of the nylon layers (i.e. the sum of thicknesses of layers C, E and G in former claim 32, now claim 49) ranges from 25% to 65% in respect of the overall thickness of the whole film. In other words, the overall

thickness of the nylon layers in the films claimed in present claim 49 is higher than the overall maximum thickness of the nylon layers in the prior art films in issue.

Due to the clear absence of any explicit and even implicit description of abovementioned features (b) and (c) in said Shepard's films, it is clear that the prior art films do not describe the feature of the films now claimed. In conclusion, the prior art films do not anticipate the said claimed films.

As admitted by the Examiner, "Shepard is silent with regard to the specific thickness claimed" (see the Office communication, page 4, item 13).

As calculated by the Examiner, "the nylon layers constitutes 5-20%, preferably 10%, of the overall thickness" of the prior art films (see the Office communication, page 3, item 8, lines 4-5 from the bottom).

Unlike the prior art films, the nylon layers constitute 45% of the overall thickness in the films claimed in claim 63. More specifically, the thickness of each layer is as follows:

Layer Thickness

C 15%

E 15%

G 15%

In the film of claim 63 the thickness of the nylon layers is a little more than twice as much as the maximum thickness value taught in Shepard, i.e. 45% versus 20%. If the preferable thickness taught by Shepard is taken into account, i.e. 10%, the claimed thickness of the nylon layers is 4.5-fold thicker in value than in the prior art films.

It is clear that the thickness value of the claimed films is not inside the range taught by Shepard nor close to the said range. In view of this large difference between the prior art thickness and the claimed thickness, therefore, in the Applicant's opinion neither

teachings nor hints come from Shepard in relation to said 45% thickness of the overall nylon layers.

Moreover, the thickness of each nylon layer is taught nowhere in the prior art.

Ramesh's embodiment reproduced by the Examiner relates to multilayer films having a gas barrier layer in the middle. The reported prior art films might resemble the films as claimed in the application under examination. As a matter of fact, the prior art films exhibit important features in conflict with important, relevant features of the films claimed in the patent application in reference.

In detail, the points are as follows.

a) Firstly, the prior art film exhibits both the outer layers made from polyamide, i.e. a polymer having higher Young's modulus. Unlike to the said prior art teaching, the film claimed in the patent application at issue exhibits only one outer layer made from a polymer having high Young's modulus. In fact, the other two layers made from a polymer having higher Young's modulus are inner layers (see claim 1, forth full paragraph), the other outer layer is, therefore, made from a polymer having lower Young's modulus.

b) One further point is the gas barrier layer, i.e. layer 32 according to Ramesh's embodiment mentioned above. The first teaching is that said layer is made from polymers preferably selected from ethylene/vinyl alcohol copolymers, polyamides, etc. (see columns 5, lines 11-15, and 17, lines 18-25). Likewise the said prior art films, the film as claimed in the case in reference exhibits a gas barrier made from a polymer with a higher Young's modulus, such as polyamide.

The second teaching is that the said barrier layer is adjacent to layer 26.

Hence, the combination of the first teaching, i.e. the use of a polymer with higher Young's modulus for gas barrier layer, and the second teaching leads to a teaching of

films having two adjacent inner layers made from higher Young's modulus.

The said teaching is not taken into account in the present invention as claimed. In fact, in contrast to Ramesh's teaching mentioned above, claim 30 expressly cites that those layers made from a polymer with higher Young's modulus are separated each other from at least one layer made from a polymer with lower Young's modulus.

c) It is acknowledge that the problem of how to reduce curl is faced by Ramesh.

However, Ramesh's solution to the said problem is completely different from that proposed by the claimed films. In detail, in view of the structure explained in abovementioned point (b), the said prior art film substantially exhibits a symmetric structure.

The substantial symmetry of the film structure is asserted in Ramesh (see column 7, lines 46-50). The advantage of a symmetric structure is that it does not, or only scarcely, exhibit the drawback of curl. Hence, Ramesh does not suggest any teaching useful to solve the same problem in films with asymmetrical structure like those claimed in the patent application in reference.

In the light of the above teachings in contrast with the features in the claimed films, a skilled artisan would not have been provided any useful suggestion from Ramesh to solve the problem of the patent application under examination and produce the films as claimed.

In the Examiner's opinion, present claims 42 and 43 are obvious over Ramesh (US 6,110,600) in view of Shibata et al. (US 4,429,079) and over Ramesh (US 6,110,600) in view of Shiiki et al. (US 6,245,437), respectively.

The film as claimed in claim 42 comprises a barrier layer made from PVA, whereas the film in claim 43 comprises a barrier layer made from PGA . The said layers are layer

E wherein PVA and PGA are substituted for polyamide, respectively.

PVA and PGA are polymers with high mechanical strength, in particular higher Young's modulus than the polymers constituting of the adjacent layers. Therefore, PVA and PGA are equivalent to polyamide for the purpose of the present invention.

The substitution of PYA or PGA for polyamide in Ramesh's films does not substantially change Ramesh's teaching. The latter still remains far from providing any useful suggestion to arrive to the claimed films in the light of the same reasons as explained in item (II).

In short, the said combinations of prior art documents do not render the subject-matter of claims 42 and 43 obvious.

Accordingly, the application and claims are believed to be in condition for allowance, and favorable action is respectfully requested.

No new matter has been added.

If any issues remain, the Examiner is respectfully invited to contact the undersigned at the number below, to advance the application to allowance.

Respectfully submitted,
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